Yearly Teaching Plan 2023-24 Subject Physics

DEPARTMENT OF PHYSICS, LATE DARAN BAI TARAM GOVERNMENT COLLEGE GURUR, BALOD, C.G.
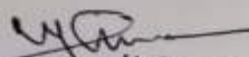
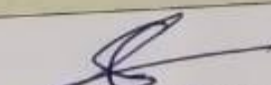| Name of Faculty – Mr. Lekhram Hirwani	Yearly Teaching Plan 2023 - 24	Class - B.Sc. 01ˢᵗ Year
Designation – Assistant Professor		Subject – Physics
		Subject Code - 004126
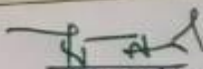
Name of Program, Class and Paper	Syllabus (Mechanics)	Required Duration
B.Sc. (PCM) 01ˢᵗ Year Paper – I	**UNIT – I** **Vectors:** Vector algebra, Derivatives of a vector with respect to a parameter, Scalar and Vector products of two, three and four vectors, Gradient, Divergence and Curl of Vectors fields, Polar and Axial vectors. **Ordinary Differential Equations:** 1ˢᵗ order homogeneous differential equations, exact and non-exact differential equations, 2ⁿᵈ order homogeneous and non-homogeneous differential equations with constant coefficients (Operator Method Only). **UNIT –II** **Law of Motion:** Review of Newton's Laws of motion, Dynamics of a system of particles, Concept of center of Mass, Determination of center of mass for discrete and continuous systems having cylindrical and spherical symmetry. **Work and Energy:** Motion of rocket, Work-Energy theorem for conservative forces, Force as a gradient of Potential Energy, Conservation of Momentum and energy, Elastic and in-elastic Collisions. **UNIT – III** **Rotational Dynamics:** Angular velocity, Angular momentum, torque, conservation of angular momentum, Moment of Inertia, Theorem of Parallel and Perpendicular axes (statements only), Calculation of Moment of Inertia of discrete and continuous objects (rod, disc, cylinder, solid sphere). **Elasticity:** Hooke's Law – Stress -Strain diagram – Elastic Moduli – Relation between elastic constants – Poisson's Ratio – Expression for Poisson's Ratio in terms of Elastic Constants – Work done in stretching and work done I twisting a wire – Twisting couple on a cylinder – Determination of Rigidity modules, Elementary idea of Surface tension and Viscosity, flow of fluids, confident of viscosity, Stoke's law, expression for terminal velocity, wetting. **UNIT – IV** **Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statements only), Satellite in circular orbit and applications, Geosynchronous orbits. **Oscillation:** Simple harmonic motion, Differential equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Compound pendulum, Differential equations of damped oscillations and forced oscillations (Conceptual Only). **UNIT – V** **Special Theory of Relativity:** Frame of reference, Galilean Transformations, Inertial and Non-inertial frames. Outcomes of Michelson Morley's Experiment, Postulates of Special Theory of Relativity, Length contraction, Time dilation, Relativistic transformation of velocity, Relativistic variation of mass. Mass-energy equivalence, Transformation of Energy and Momentum.	40 Min. x 18 Periods Per Unit = 12 Hours Per Unit (Total 60 Hours) 90 Periods (From July 23 to February 24)

Name of Program, Class and Paper	Syllabus (Electricity and Magnetism)	Required Duration
B.Sc. (PCM) 01st Year Paper - II	**UNIT – I** **Vector Analysis:** Vector Integration, Line, Surface and Volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors and its application in electrostatics and magnetostatics. **UNIT – II** **Electrostatics:** Electrostatic Field, electric flux, Gauss's theorem of electrostatics, application of Gauss theorem, Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charge sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere, Calculation of electric field from potential, capacitance of an isolated spherical conductor, Parallel, plate, spherical and cylindrical condenser, Energy per unit volume in electrostatic field. **UNIT – III** **Dielectric & Electric Currents:** Dielectric medium, Polarization, Displacement Vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric. steady current, Current density J, non – steady current, a continuity equation, Kirchoff's law (statement Only), Ideal constant – voltage and constant – current sources, Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem and maximum power transfer theorem, Rise and decay of current in LR, CR, LCR circuits. **UNIT – IV** **Magnetism:** Magnetostatics: Biot-Svart's law and its applications, Straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law. Magnetic Properties of Materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia, para and ferro magnetic materials **UNIT – V** **Electromagnetic induction:** Faraday's law of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field. **Maxwell's Equations and Electromagnetic wave propagation:** Equation of continuity of current, Displacement Current, Maxwell's equations, Wave equation in free space.	40 Min. x 18 Periods Per Unit = 12 Hours Per Unit (Total 60 Hours) 90 Periods (From July 23 to February 24) Total Duration : 120 Hours 180 Periods

In-Charge Facolty Professor
... College Gurur

H. HoD.
Department of Physics
... College Gurur

IQAC Coordinator
IQAC
Government College Gurur
Dist. Balod (C.G.)

Principal
Government College Guru.
Dist. Balod (C.G.)

Monthly Teaching Plan 2023-24 Subject -Physics

Monthly Teaching Plan 2023 - 24
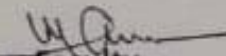
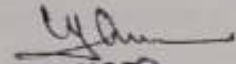| Program Name – B.Sc. (PCM)		Class – 01ˢᵗ Year	Paper – 01ˢᵗ (Mechanics) Paper – 02ⁿᵈ (Electricity and Magnetism)				
S N	Month	Curriculum Plan		No. of Periods	Teaching Method	Activity	Exam or Test
01	July 2023	**PAPER – I, UNIT – I** **Vectors:** Vector algebra, Derivatives of a vector with respect to a parameter, Scalar and Vector products of two, three and four vectors, Gradient, Divergence and Curl of Vectors fields, Polar and Axial vectors. **Ordinary Differential Equations:** 1ˢᵗ order homogeneous differential equations, exact and non-exact differential equations, 2ⁿᵈ order homogeneous and non-homogeneous differential equations with constant coefficients (Operator Method Only). **PAPER – I, UNIT –II** **Law of Motion:** Review of Newton's Laws of motion, Dynamics of a system of particles, Concept of center of Mass, Determination of center of mass for discrete and continuous systems having cylindrical and spherical symmetry. **Work and Energy:** Motion of rocket, Work-Energy theorem for conservative forces, Force as a gradient of Potential Energy, Conservation of Momentum and energy, Elastic and in-elastic Collisions.		23	Chock & Talk PPT Chart	Poster Making, Student Seminar	Unit Test
02	August 2023	**PAPER – I, UNIT – III** **Rotational Dynamics:** Angular velocity, Angular momentum, torque, conservation of angular momentum, Moment of Inertia, Theorem of Parallel and Perpendicular axes (statements only), Calculation of Moment of Inertia of discrete and continuous objects (rod, disc, cylinder, solid sphere). **Elasticity:** Hooke's Law – Stress -Strain diagram – Elastic Moduli – Relation between elastic constants – Poisson's Ratio – Expression for Poisson's Ratio in terms of Elastic Constants – Work done in stretching and work done I twisting a wire – Twisting couple on a cylinder – Determination of Rigidity modules, Elementary idea of Surface tension and Viscosity, flow of fluids, confident of viscosity, Stoke's law, expression for terminal velocity, wetting.		22	Chock & Talk PPT Demonstration Remedial Class Revision Class	Poster Making, Student Seminar, Quiz Competition	Unit Test
03	September 2023	**PAPER – I, UNIT –II** **UNIT – IV** **Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statements only), Satellite in circular orbit and applications, Geosynchronous orbits. **Oscillation:** Simple harmonic motion, Differential equation of SHM and its solutions,		23	Chock & Talk PPT Virtual Demonstration Remedial Class	Poster Making, Group Discussion	Unit Test

		Kinetic and Potential Energy, [...] Energy and their time averages, Compound pendulum, Differential equations of damped oscillations and forced oscillations (Conceptual Only).				
04	October 2023	**PAPER – I, UNIT – V** **Special Theory of Relativity:** Frame of reference, Galilean Transformations, Inertial and Non-inertial frames. Outcomes of Michelson Morley's Experiment, Postulates of Special Theory of Relativity, Length contraction, Time dilation, Relativistic transformation of velocity, Relativistic variation of mass. Mass-energy equivalence, Transformation of Energy and Momentum. **PAPER – II, UNIT – I** **Vector Analysis:** Vector Integration, Line, Surface and Volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors and its application in electrostatics and magnetostatics.	22	Chock & Talk PPT Virtual Demonstration Remedial Class Revision Class	Poster Making, Student Seminar, Quiz Competition, Group Discussion	Unit Test
05	November 2023	**PAPER – II, UNIT – II** **Electrostatics:** Electrostatic Field, electric flux, Gauss's theorem of electrostatics, application of Gauss theorem, Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charge sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere, Calculation of electric field from potential, capacitance of an isolated spherical conductor, Parallel, plate, spherical and cylindrical condenser, Energy per unit volume in electrostatic field.	23	Chock & Talk PPT Chart Virtual Demonstration Remedial Class Revision Class	Poster Making Student Seminar	Unit Test & Sessional Exam - I
06	December 2023	**PAPER – II, UNIT – III** **Dielectric & Electric Currents:** Dielectric medium, Polarization, Displacement Vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric. steady current, Current density J, non – steady current, a continuity equation, Kirchoff's law (statement Only), Ideal constant – voltage and constant – current sources, Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem and maximum power transfer theorem, Rise and decay of current in LR, CR, LCR circuits.	23	Chock & Talk PPT Chart Virtual Demonstration Remedial Class Revision Class	Poster Making Student Seminar	Unit Test & Sessional Exam - II
07	January 2024	**PAPER – II, UNIT – IV** **Magnetism:** Magnetostatics: Biot-Svart's law and its applications, Straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law. Magnetic Properties of Materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia, para and ferro magnetic materials	23	Chock & Talk PPT Chart Virtual Demonstration Remedial Class Revision Class	Poster Making, Student Seminar Quiz Competition	Pre Final Exam

| 08 | February 2024 | PAPER – II, UNIT – V
Electromagnetic induction: Faraday's law of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field.
Maxwell's Equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement Current, Maxwell's equations, Wave equation in free space. | 22 | Chock & Talk
Chart
Virtual
Demonstration
Remedial Class
Revision Class | Poster Making,
Student Seminar
Group
Discussion | - |
| | 08 Months | Two Papers – 10 Units | 180 Periods | | | 09 Internal Exams |

In-Charge Professor
Faculty
Government College Guru
Dist. Balod (C.G.)

H. O.D.
Department of Physics
Government College Gurur
Dist. Balod (C.G.)

IQAC Co-ordinator
IQAC
Government College Gurur
Dist. Balod (C.G.)

Principal
Government College Gurur
Dist. Balod (C.G.)